



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/771,799 | 01/29/2001 | Robert Henry Francis | | 7834 |

7590 02/01/2005
Robert H Francis
8 Bayridge Court
Gaithersburg, MD 20878

EXAMINER

BARNES, CRYSTAL J

ART UNIT PAPER NUMBER

2121

DATE MAILED: 02/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/771,799

Applicant(s)

FRANCIS, ROBERT HENRY

Examiner

Crystal J. Barnes

Art Unit

2121

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
4a) Of the above claim(s) 1 and 2 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 3 and 4 is/are rejected.
7) ☒ Claim(s) 3 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 27 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 27 Apr. '04.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 2001 April 12 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the non-patent literature document referred to therein has not been considered.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference numbers 42, 46, 50, 56, 60 and 62 in figure 2 are not mentioned in the specification. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

DETAILED ACTION

1. The following is a Final Office Action in response to the Amendment received 27 April 2004. Claims 1 and 2 have been cancelled. New claims 3 and 4 have been added. Claims 3 and 4 are now pending in this application.

Information Disclosure Statement

2. The examiner is considering the information disclosure statements (IDS) submitted 31 December 2003.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: reference number 62 in figure 2 is not mentioned in the description.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: reference number 51 on page 11 first full paragraph is not shown in figure 2.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "52" has been used to designate both "Set each element of Z stack to 0" and "Adjust K_{bias} " in figure 2.

6. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

7. Claim 3 is objected to because of the following informalities: repeated occurrence of "for said setpoint" should be deleted in item b. Appropriate correction is required.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 3 and 4 are rejected as failing to define the invention in the manner required by 35 U.S.C. 112, second paragraph.

The claims are narrative in form and replete with indefinite and functional or operational language. The structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device. The claims must be in one sentence form only. Note the format of the claims in the patents cited.

10. Claims 3 and 4 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention.

Evidence that claims 3 and 4 fail to correspond in scope with that which applicant regard as the invention can be found in the reply filed 27 April 2005. In that paper, applicant has stated "a controller calculation function that includes an nth-order exponential operation" and "a controller that reduces the resources necessary to move a process (measured) parameter to set point", and these statements indicate that the invention is different from what is defined in the claims because claim 3 attempts to recite structure ("means") of a continuous time domain polynomial feedback controller as admitted by applicant in the remarks. The means has to be defined as either hardware or software. Claim 3 does not recite steps in a process for rapidly controlling a process (measured) parameter to a set point without overshoot using a continuous time domain polynomial feedback controller as required by the preamble. Claim 4 recites a specific application of the controller. Claim 4 does not recite any additional steps in a process using a controller as required by the preamble.

11. Claims 3 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

12. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 3 recites the broad recitation "resources", and the claim also recites "energy, materials, time, etc." which is the narrower statement of the range/limitation.

13. Regarding claim 3, the term "etc." renders the claims indefinite because the claim includes elements not actually disclosed (those encompassed by "etc."), thereby rendering the scope of the claim unascertainable. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

15. Claim 3 is rejected under 35 U.S.C. 102(e) as being anticipated by USPN 6,311,680 B1 to Bradley, Sr. et al.

As per claim 3, the Bradley, Sr. et al. reference discloses a process, as applied in the field of thermal or chemical fluid process control, for rapidly controlling a process (measured) parameter to a setpoint without overshoot using a continuous time domain polynomial feedback controller comprising of: a means for accepting (see column 3 lines 25-34, "proportional controller 116, integral controller 118") an error signal ("error signal") from an error signal calculator ("difference") and calculating (see column 4 lines 16-20, "sub-system 100") a continuous type controller output ("bias values") using a user tuned time domain

Art Unit: 2121

polynomial equation (see column 4 lines 31-36, "integral KAM selector 126"), which includes an nth-order exponent ("KAMs 124") in a feedback configuration ("feedback loop"); a means for automatically converting to an integral correction (see column 4 lines 50-60, "integral controller 118") for said setpoint maintenance ("rich/lean condition") based on user defined criteria ("setpoint"); and a user selectable means ("integral controller 118") for improving a bias tuning parameter (see column 3 lines 1-3, "bias trim 102") automatically based on user defined criteria ("setpoint"); whereby said controller (see column 3 lines 1-3, "base fuel controller 104") moves said process parameter (see column 3 lines 22-30, "post-cat EGO sensor 112") to said setpoint ("post-cat EGO sensor setpoint 114") more rapidly (see column 3 lines 45-53, "quickly") in applications where overshoot ("overshoot and oscillation") is not allowed requiring fewer resources (energy, materials, time, etc.) (see column 5 lines 36-40, "emissions") to achieve said setpoint ("post-cat EGO sensor setpoint 114").

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2121

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,311,680 B1 to Bradley, Sr. et al. in view of logical reasoning.

As per claim 4, the Bradley, Sr. et al. reference does not expressly disclose said controller improves (reduces) process/product variability when used for ingredient addition into a production batch or process stream or for product filling applications requiring less materials necessary to achieve said setpoint.

However, it would have been logically to one of ordinary skill in the art to modify the closed-loop air fuel control system by applying the adaptive bias sub-system to ingredient addition into a production batch or process stream or product filling applications.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the closed-loop air fuel control system taught by the Bradley, Sr. et al. reference by applying the adaptive bias sub-system to ingredient addition into a production batch or process stream or product filling

applications to allow an integral controller to fine-tune ratios to reach target set points after a proportional controller has adjusted the ratios near the set points.

One of ordinary skill in the art would have been motivated to apply the adaptive bias sub-system to ingredient addition into a production batch or process stream or product filling applications to allow an integral controller to fine-tune ratios to reach target set points after a proportional controller has adjusted the ratios near the set points to further limit the possibility of low frequency oscillations while still preserving the fast response of the proportional controller and the accuracy of the integral controller.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following references are cited to further show the state of the art with respect to optimization/adaptive control in general:

USPN 6,142,163 to McMillin et al.

USPN 5,965,410 to Chow et al.

USPN 5,901,059 to Tao et al.

USPN 4,445,180 to Davis et al.

USPN 3,708,754 to Diehl

19. An examination of this application reveals that applicant is unfamiliar with patent prosecution procedure. While an inventor may prosecute the application, lack of skill in this field usually acts as a liability in affording the maximum protection for the invention disclosed. Applicant is advised to secure the services of a registered patent attorney or agent to prosecute the application, since the value of a patent is largely dependent upon skilled preparation and prosecution. The Office cannot aid in selecting an attorney or agent.

Applicant is advised of the availability of the publication "Attorneys and Agents Registered to Practice Before the U.S. Patent and Trademark Office." This publication is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.**

See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

21. This action is a **final rejection** and is intended to close the prosecution of this application. Applicant's reply under 37 CFR 1.113 to this action is limited either to an appeal to the Board of Patent Appeals and Interferences or to an amendment complying with the requirements set forth below.

If applicant should desire to appeal any rejection made by the examiner, a Notice of Appeal must be filed within the period for reply identifying the rejected

claim or claims appealed. The Notice of Appeal must be accompanied by the required appeal fee.

If applicant should desire to file an amendment, entry of a proposed amendment after final rejection cannot be made as a matter of right unless it merely cancels claims or complies with a formal requirement made earlier.

Amendments touching the merits of the application which otherwise might not be proper may be admitted upon a showing a good and sufficient reasons why they are necessary and why they were not presented earlier.

A reply under 37 CFR 1.113 to a final rejection must include the appeal from, or cancellation of, each rejected claim. The filing of an amendment after final rejection, whether or not it is entered, does not stop the running of the statutory period for reply to the final rejection unless the examiner holds the claims to be in condition for allowance. Accordingly, if a Notice of Appeal has not been filed properly within the period for reply, or any extension of this period obtained under either 37 CFR 1.136(a) or (b), the application will become abandoned.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Crystal J. Barnes whose telephone number is

571.272.3679. The examiner can normally be reached on Monday-Friday alternate Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on 571.272.3687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CJB
26 January 2005


Anthony Knight
Supervisory Patent Examiner
Group 3600